Case report

Ukrainian Neurosurgical Journal. 2026;32(2):105-111
doi: 10.25305/unj.344728

Single-Stage Salvage for Recurrent Carpal Tunnel Syndrome and Delayed Guyon's Canal Syndrome Following Open Release: A Case Report

Nhat D. H. Nguyen [1,2], Huy A. Pham [3], Phi D. Nguyen [4]

[1] Center of Orthopedic and Plastic Surgery, Hue Central Hospital, Hue city, Vietnam
[2] Biomedical Engineering Department, National Cheng Kung University, Tainan, Taiwan
[3] Division of Surgery, Hue University of Medicine and Pharmacy, Hue city, Vietnam
[4] Department of Orthopaedic - Burn - Plastic Surgery, City Children's Hospital, Tan Kien Ward, Binh Chanh District, Ho Chi Minh city, Vietnam

Received: 28 November 2025
Accepted: 26 January 2026

Address for correspondence*:*
Nhat D. H. Nguyen, Center of Orthopedic and Plastic Surgery, Hue Central Hospital, 16 Le Loi street, Hue city, 490000, Vietnam, email: nguyendanghuynhat@gmail.com

Introduction: Recurrent carpal tunnel syndrome (CTS) is commonly attributed to incomplete decompression or perineural scarring. However, delayed-onset ulnar nerve compression at Guyon's canal after carpal tunnel release (CTR) is extremely rare and presents diagnostic and therapeutic challenges.

Case report: We report the case of a 50-year-old man who developed dual neuropathies, recurrent median nerve compression, and new-onset ulnar nerve entrapment, approximately one year after open CTR. He presented with diffuse hand paresthesia, weakness, ulnar digit clawing, and impaired thumb opposition. Electrodiagnostic studies revealed severe axonal damage in both the median and ulnar nerves. Surgical intervention was performed via a single palmar incision, including dual nerve decompression, epineurolysis, hypothenar fat pad grafting, and opponensplasty using the extensor indicis proprius (EIP) tendon. At one-year follow-up, the patient demonstrated full sensory recovery, regained thumb opposition, improved grip and pinch strength, and no recurrence of symptoms.

Conclusion: This case highlights the importance of comprehensive clinical and electrodiagnostic reassessment in patients with recurrent or evolving symptoms after CTR. A single-stage, integrated surgical approach may constitute a viable management option in carefully selected patients with complex dual nerve entrapments and is presented as an illustrative example for comparable challenging clinical situations.

Keywords: *carpal tunnel syndrome; case report; Guyon's canal; median nerve; ulnar nerve*

Introduction

As the leading compression neuropathy, carpal tunnel syndrome (CTS) stems from pressure on the median nerve at the wrist, producing symptoms such as paresthesia, sensory loss, and hand weakness. While the etiology is often idiopathic, the condition is frequently linked to repetitive wrist use [1, 2]. Carpal tunnel release (CTR) remains the standard treatment, with open surgery considered the gold standard. Although endoscopic methods may allow for faster recovery, they carry higher technical demands and potential risks. Recurrence affects 3–25% of cases, often attributable to incomplete release, perineural scarring, or underlying conditions such as cervical radiculopathy or diabetic neuropathy. Persistent or recurrent cases may require revision surgery or opponensplasty to restore function [3, 4].

Ulnar neuropathy at Guyon's canal is a distinct nerve compression of the wrist. It is less common than CTS but can cause significant motor, sensory, or mixed deficits depending on the specific site of compression. Etiologies typically include ganglions, vascular abnormalities, trauma, osteoarthritis, and congenital anomalies. Notably, the development of ulnar nerve complications after CTR is rare and has historically been associated with endoscopic techniques rather than open surgery [5, 6].

This case presents a rare combination of recurrent CTS and delayed-onset ulnar nerve compression at Guyon's canal following an open CTR. While recurrent CTS is frequently documented in relation to incomplete release or fibrosis, secondary ulnar neuropathy remains uncommon and underreported. This dual entrapment highlights the necessity for meticulous evaluation and extended follow-up in patients presenting with persistent or evolving symptoms after carpal tunnel release.

Case report

A 50-year-old right-handed man developed worsening right-hand weakness, numbness, and ulnar-sided clawing one year after open CTR for median nerve compression. Initially, thenar atrophy was present, but ulnar nerve function remained intact. Postoperatively, median nerve symptoms improved except for weak thumb opposition. After 12 months, new paresthesia involving all digits and increasing weakness, particularly in the ulnar nerve distribution, suggested a secondary neuropathy. Physical examination revealed persistent thenar and hypothenar wasting, as well as claw deformity of the ring and little fingers. Vascular assessment using the Allen test was normal, indicating unobstructed ulnar inflow and adequate collateral circulation. Sensory evaluation demonstrated impaired two-point discrimination (>6 mm), while provocative testing yielded positive Phalen's tests and Tinel–Hoffmann signs over both the carpal tunnel and Guyon's canal, reproducing the patient's

Copyright © 2026 Nhat D. H. Nguyen, Huy A. Pham, Phi D. Nguyen
This work is licensed under a Creative Commons Attribution 4.0 International License
https://creativecommons.org/licenses/by/4.0/

paresthesia. Further motor assessment confirmed ulnar nerve dysfunction, evidenced by a positive Froment's sign and weakness in the ulnar-innervated intrinsic muscles (***Fig. 1***). Additionally, pre-existing chronic rigidity and distal phalangeal shortening resulting from a previous injury were noted in the proximal and distal interphalangeal joints of the little finger, unrelated to the current nerve pathology. Electrodiagnostic studies demonstrated absent sensory nerve action potentials (SNAPs) for the median nerve and prolonged distal motor latency (>6.5 ms). Similarly, ulnar nerve conduction studies revealed reduced motor conduction velocity across the wrist segment and denervation potentials in the abductor digiti minimi, confirming severe axonal damage in both the median and ulnar nerves. Plain radiographs of the wrist were obtained to rule out bony abnormalities or carpal instability, although findings were unremarkable. Musculoskeletal ultrasound or MRI was not performed given the high concordance between the clinical presentation and electrodiagnostic findings. Systemic causes, such as amyloidosis, were considered unlikely given the localized, mechanical pattern. Cervical pathology was excluded based on the absence of neck or radicular symptoms, normal cervical examination and imaging, and electrophysiological findings confirming localization of the neuropathies to the wrist without proximal involvement. The patient had no history of diabetes mellitus, rheumatoid arthritis, gout, or recent wrist trauma. Prior to considering revision surgery, a trial of conservative management was attempted, including night splinting and oral non-steroidal anti-inflammatory drugs (NSAIDs) for six weeks, but these measures failed to alleviate symptoms.

A single extended palmar incision allowed simultaneous exploration of the carpal tunnel and Guyon's canal. Intraoperative exploration revealed that the distal one-third of the transverse carpal ligament (TCL) remained intact, creating a persistent constriction band. The median nerve was found compressed specifically at this distal margin, confirming an incomplete primary release (***Fig. 2***). The intact median nerve, encased in scar tissue, was released along with the ulnar neurovascular bundle; both structures underwent epineurolysis. Opponensplasty was performed using the extensor indicis proprius (EIP) tendon, which was transferred subcutaneously around the ulnar aspect of the wrist, routed volar to the pisiform bone, to the abductor pollicis brevis (APB) insertion (***Fig. 3***). A protective layer was created over the median nerve using a hypothenar fat pad flap. Postoperatively, the hand was splinted for three weeks, followed by targeted rehabilitation.

At follow-up, the patient showed progressive functional recovery. At one month post-operatively, sensory symptoms had resolved, finger movement had returned, and therapy for thumb opposition began, despite mild discomfort near the pisiform from EIP transfer. By six months, intrinsic strength, grip, and pinch had significantly improved, with effective thumb opposition and only mild residual clawing (***Video https://theunj.org/article/view/344728/347100***). Electromyography (EMG) showed restored ulnar motor and sensory function, although APB compound muscle action potentials (CMAPs) were still absent. At one year, the patient achieved fine motor control, improved two-point discrimination (<5 mm), and reduced clawing (***Fig. 4***). EMG confirmed reinnervation of both nerves, including partial recovery of APB CMAPs. Disabilities of the Arm, Shoulder and Hand (DASH) scores reflected this progress, improving from 65.8 preoperatively to 38.3 at six months and 10.8 at one year (***Suppl. 1–3***).

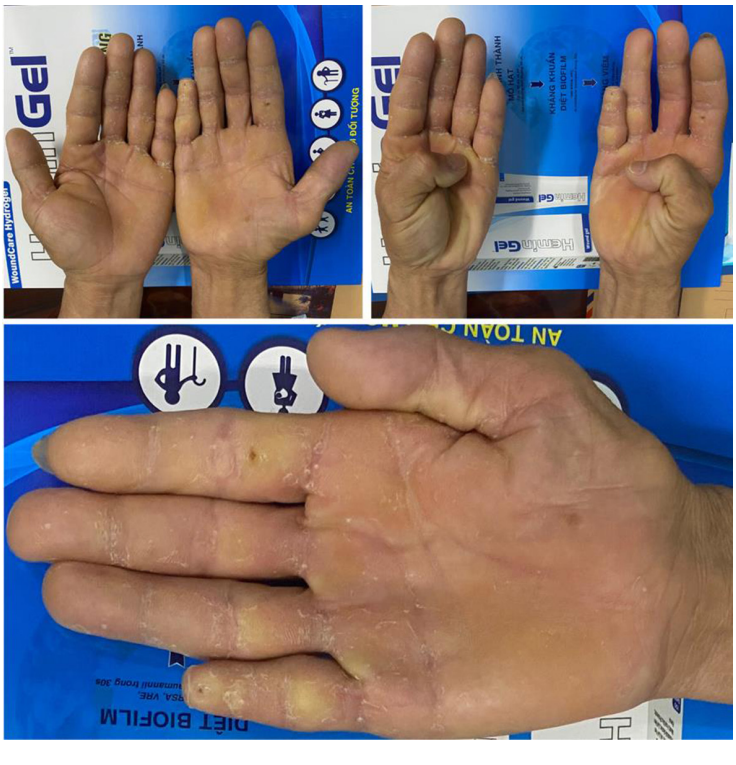


Fig. 1. Preoperative clinical appearance of the right hand showing pronounced thenar atrophy, mild clawing of the fourth and fifth digits, and impaired opposition, including a view demonstrating the specific inability to perform active palmar abduction due to complete abductor pollicis brevis paralysis

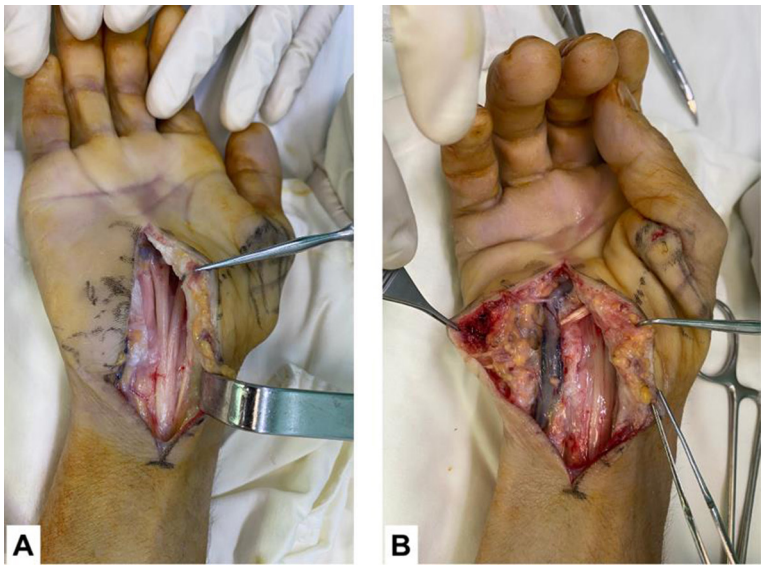


Fig. 2. Preoperative surgical plan and intraoperative findings illustrating combined decompression of the carpal tunnel and Guyon's canal through a single palmar incision: (A) An intact median nerve was confirmed after completing the distal ligament release; (B) Complete decompression of both median and ulnar nerves with preparation of a hypothenar-based adipose flap for protective coverage. *Note:* The ulnar vessels appear dilated due to venous congestion and tourniquet effect; however, arterial patency was confirmed intraoperatively

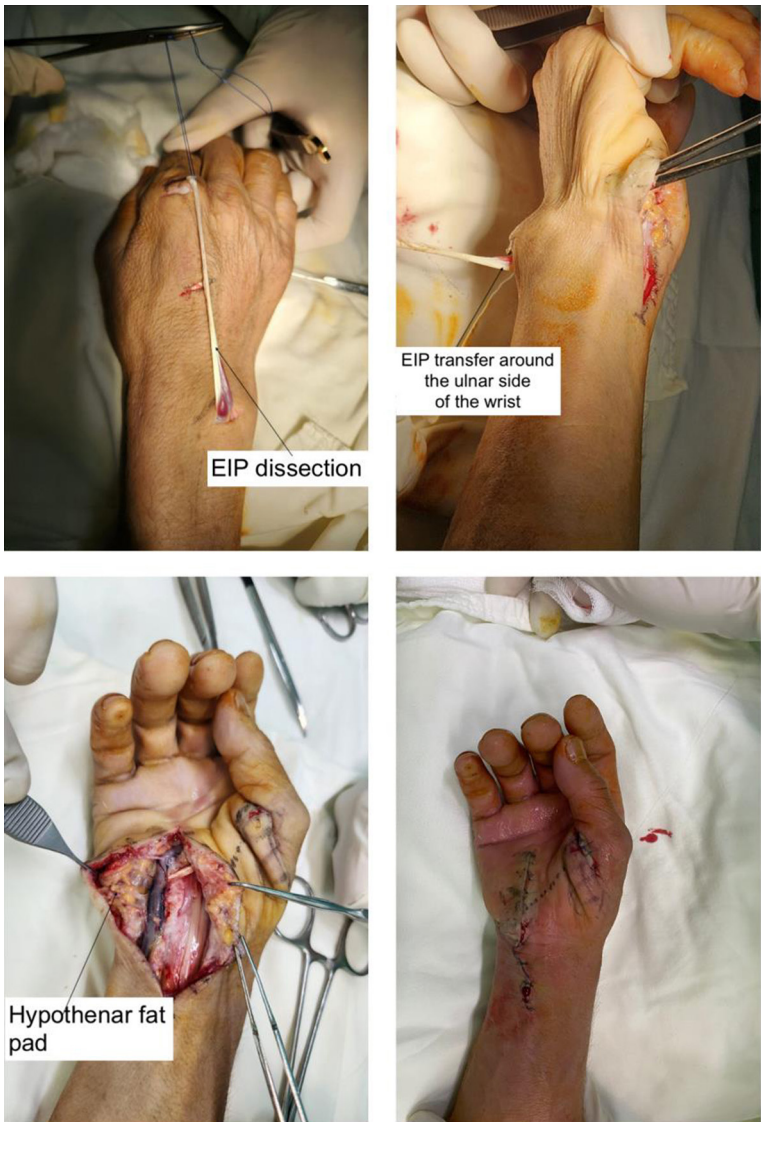


Fig. 3. The Extensor Indicis Proprius (EIP) tendon was transferred subcutaneously around the ulnar aspect of the wrist, passing volar to the pisiform bone, to the abductor pollicis brevis (APB) insertion. Additionally, a hypothenar-based adipose flap was prepared to provide soft tissue coverage over the decompressed median nerve

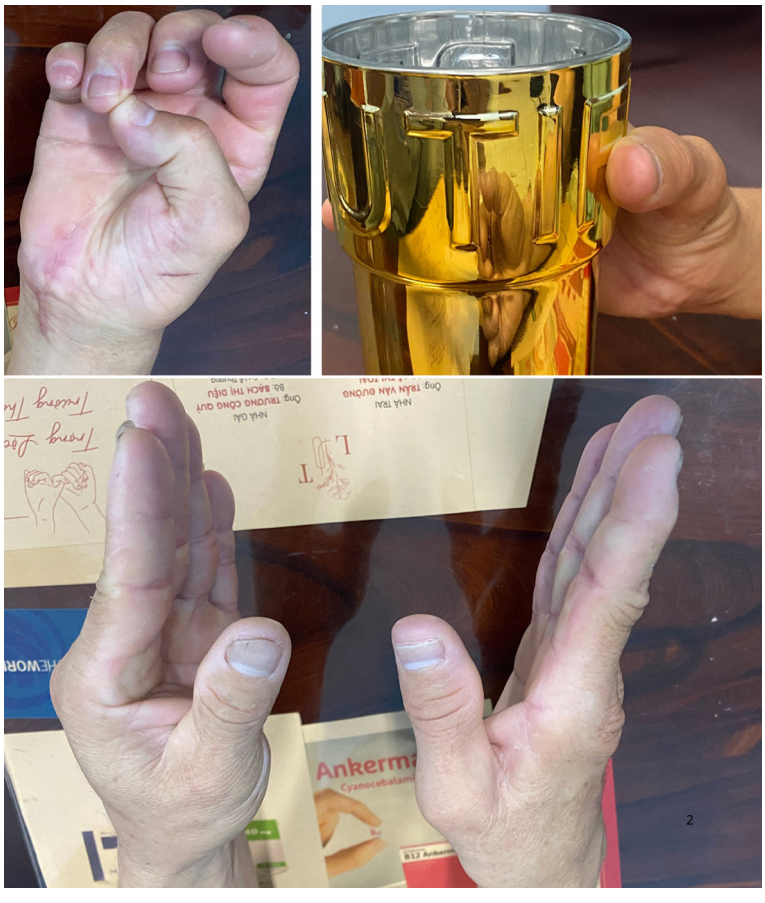


Fig. 4. One-year postoperative follow-up demonstrating functional recovery of the intrinsic hand musculature. The patient exhibits restored cylindrical grasp and stable key pinch. Effective thumb-to-index finger opposition is achieved, accompanied by enhanced palmar abduction and pronation

Supplementary 1 (https://theunj.org/article/view/344728/347088). The patient's preoperative DASH score was 65.8, indicating substantial functional impairment. This high score reflected significant difficulty in performing daily tasks, including tool use, gripping, lifting, and fine motor activities.

Supplementary 2 (https://theunj.org/article/view/344728/347089). At the 6-month follow-up, the patient's DASH score had improved to 38.3, reflecting moderate functional recovery and a meaningful reduction in disability during daily activities.

Supplementary 3 (https://theunj.org/article/view/344728/347090). By 12 months postoperatively, the patient's DASH score had decreased to 10.8, consistent with minimal disability and near-complete restoration of hand function.

Discussion

Persistent symptoms after CTR are most often due to incomplete ligament transection, whereas true recurrence involves the return of symptoms after initial relief. Common causes include technical errors, scarring, prolonged immobilization, or insufficient rehabilitation [2,5]. Although systemic conditions like amyloidosis can contribute, particularly in bilateral or atypical cases, our patient had no systemic signs, and the unilateral, anatomically consistent presentation pointed to mechanical compression [7]. Given the low clinical suspicion, tissue biopsy was deferred, with extended follow-up planned to monitor for any future systemic indicators.

To minimize perineural scarring after revision surgery, soft tissue interposition methods, such as fascial, muscle, and fat pad flaps, are commonly used [2,8,9]. In the present case, a hypothenar fat pad graft was chosen, as it permits straightforward harvest through the same surgical incision and provides a well-vascularized protective layer for coverage of the neurolysed median nerve. Importantly, the choice of this flap was guided by surgeon familiarity, anatomical feasibility in this patient, and the specific pattern and extent of scarring within the distal carpal tunnel. Although sensory symptoms resolved after the initial CTR, persistent thumb opposition loss due to thenar atrophy required EIP tendon transfer, as the deficit severely affected the patient's daily and occupational function. Biomechanically, the EIP tendon provided an optimal line of pull and adequate excursion with minimal donor-site morbidity. While the transfer necessitated routing through the ulnar scar, meticulous release ensured unimpeded gliding. Furthermore, because the thumb metacarpophalangeal (MCP) joint exhibited no

hyperextension instability, we opted for a direct insertion into the APB tendon, avoiding the additional complexity of the dorsal weaving to the extensor pollicis longus (EPL) [10].

A systematic review reported that CTS can alter the structure of Guyon's canal and impair ulnar nerve conduction, with 79% of studies showing a link between median nerve severity and ulnar dysfunction [11]. While standard CTR typically decreases pressure in Guyon's canal by relaxing the canal floor fibers, the opposite occurred in this patient. We hypothesize that the incomplete release of the distal transverse carpal ligament created a localized pressure point. Furthermore, postoperative scarring from the initial surgery likely tethered the ulnar neurovascular bundle, preventing its normal excursion and leading to secondary traction neuropathy (***Fig. 5***). This underscores that, while 'pillar pain' is common, progressive ulnar paresthesia suggests a mechanical etiology requiring re-exploration. This rare coexistence highlights the importance of clinical vigilance and repeat electrodiagnostic testing when symptoms persist or evolve after CTR.

A single-stage surgical approach was used to simultaneously decompress the carpal tunnel and Guyon's canal through one incision, minimizing tissue disruption and the risk of additional scarring. A hypothenar fat pad graft was placed over the median nerve to reduce perineural fibrosis, and thumb opposition was restored with an EIP tendon transfer. This integrated strategy led to complete sensory and motor recovery at 12 months, with no recurrence. Postoperative rehabilitation was crucial to recovery, emphasizing a structured program that included controlled motion, range-of-motion exercises, grip and pinch strengthening, opposition training, and sensory re-education.

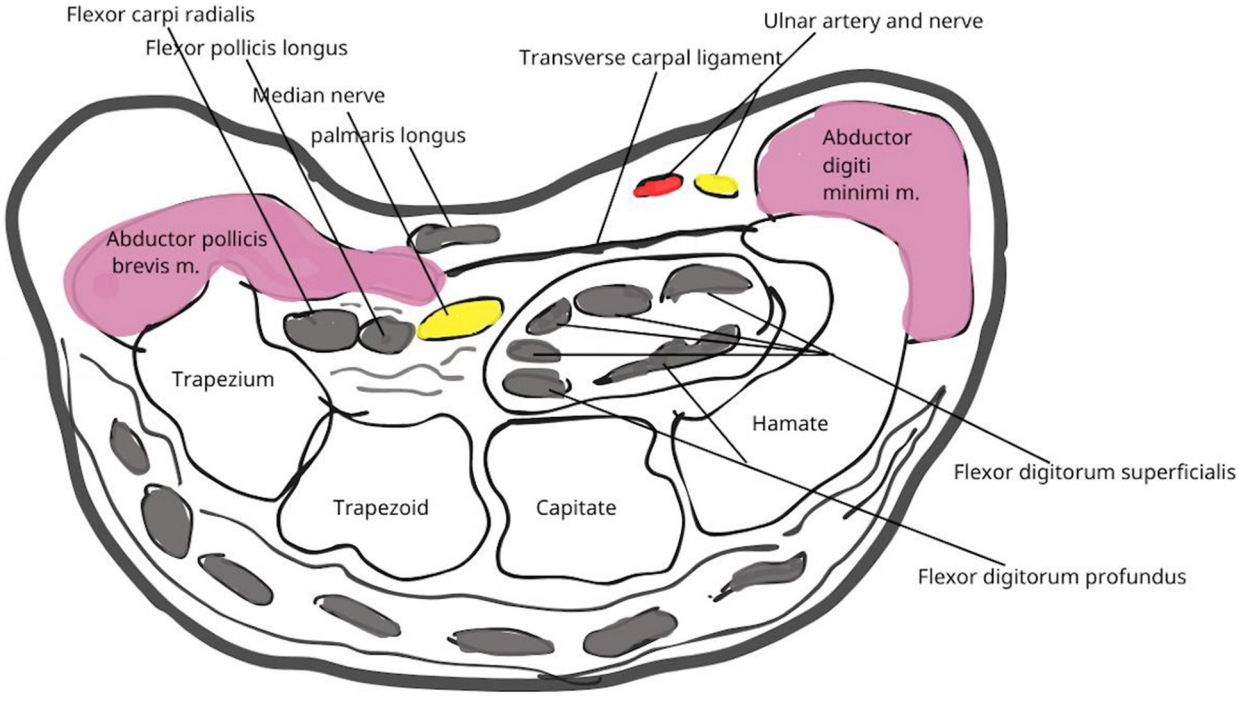
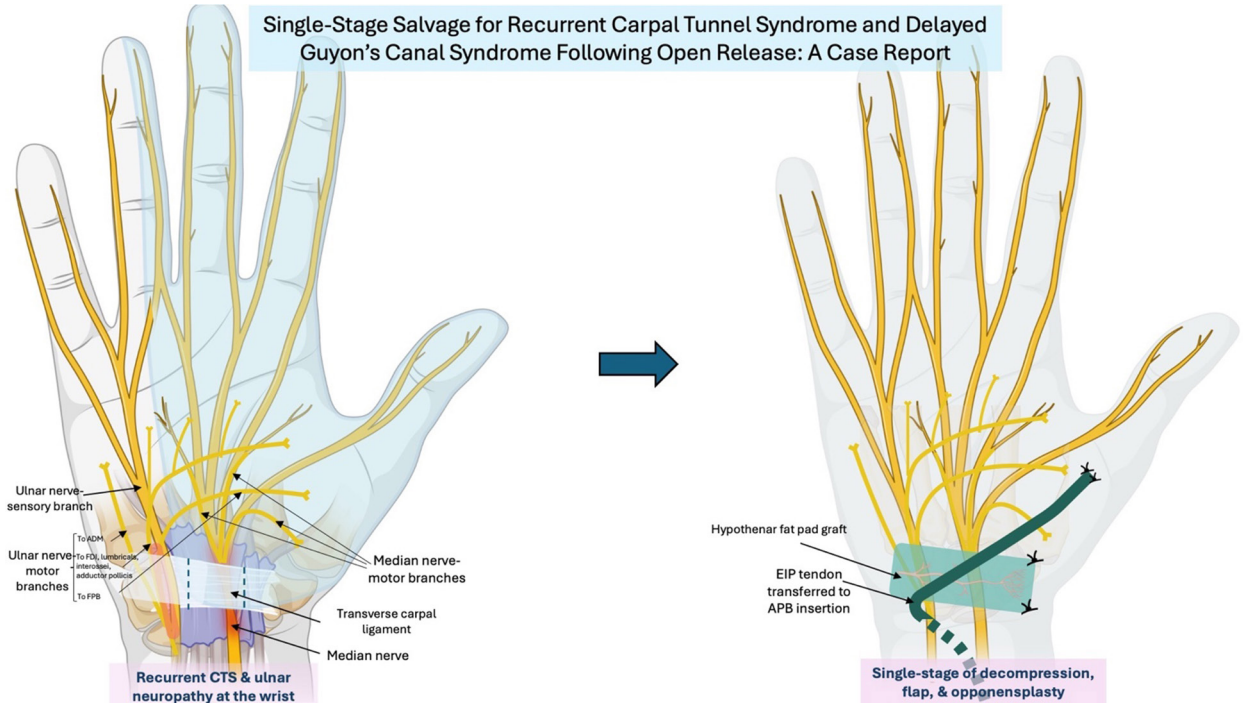


Fig. 5. This schematic illustrates the "Tethering Effect" arising from the shared boundary of the TCL between the carpal tunnel and Guyon's canal. It depicts how an incomplete distal TCL release creates a pressure point, while postoperative fibrosis extends into Guyon's canal to adhere to the ulnar neurovascular bundle

Graphical abstract



Summary diagram illustrating the coexistence of recurrent CTS and ulnar nerve entrapment at Guyon's canal. The schematic demonstrates the integrated surgical strategy, single-incision dual decompression, hypothenar fat pad grafting, and opponensplasty, used to achieve successful functional recovery in this patient.

Conclusion

This case highlights the rare coexistence of recurrent CTS and ulnar nerve entrapment at Guyon's canal. It emphasizes the importance of thorough clinical and electrophysiological evaluation in atypical presentations following CTR. The successful outcome using single-incision dual decompression, fat pad grafting, and opponensplasty supports this integrated approach as an effective strategy for managing complex compressive neuropathies.

Acknowledgement

The authors would like to thank their colleagues for their support and contributions during the preparation of this report. Special appreciation is extended to the patient for consenting to share his case and outcome.

Portions of the text were generated or edited with the assistance of ChatGPT (OpenAI, San Francisco, CA, USA). All statements were reviewed and verified by the authors.

Disclosure

Ethical approval

Ethical approval for this study was obtained from the Institutional Review Board of Hue Central Hospital (No. 263/QD-BVH). The study protocol adhered to the ethical standards outlined in the 1964 Declaration of Helsinki and its later amendments. All procedures performed in this study involving human participants were in accordance with these standards.

Statement of informed consent

Written informed consent was obtained from the patient to be included in the study. The use of individual information, disease statement, and images was accepted by the patient.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest concerning this article's research, authorship, or publication. There are no beneficial conflicts with any medical device company related to research and publication.

Funding

The author(s) received no financial support for the research, authorship, or publication of this article.

Authors' contributions:

NDHN conceived and designed the study, collected and organized data, performed formal analysis, and wrote the initial and final drafts of the article. HAP contributed to investigation, visualization, and critical review of the manuscript. PDN provided supervision and oversight. All authors have critically reviewed and approved the final draft and are responsible for the manuscript's content, integrity and originality. .

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that they have used AI-assisted technology to assist in the writing and editing of the manuscript.

References

1. Chammas M. Carpal tunnel syndrome. Chir Main. 2014 Apr;33(2):75-94. doi: 10.1016/j.main.2013.11.010
2. Krześniak NE, Noszczyk BH. Autologous Fat Transfer in Secondary Carpal Tunnel Release. Plast Reconstr Surg Glob Open. 2015 Jun 5;3(5):e401. doi: 10.1097/GOX.0000000000000374

3. Lattré T, Brammer S, Parmentier S, Van Holder C. Hypothenar fat pad flap surgery for end stage and recurrent carpal tunnel syndrome. Hand Surg Rehabil. 2016 Oct;35(5):348-354. doi: 10.1016/j.hansur.2016.08.003
4. Hirakawa A, Komura S, Nohara M, Masuda T, Matsushita Y, Akiyama H. Opponensplasty by the Palmaris Longus Tendon to the Rerouted Extensor Pollicis Brevis Transfer With Endoscopic Carpal Tunnel Release in Severe Carpal Tunnel Syndrome. J Hand Surg Am. 2021 Nov;46(11):1033.e1-1033.e7. doi: 10.1016/j.jhsa.2021.04.007
5. Ozdemir O, Calisaneller T, Gulsen S, Caner H. Ulnar nerve entrapment in Guyon's canal due to recurrent carpal tunnel syndrome: case report. Turk Neurosurg. 2011;21(3):435-7. doi: 10.5137/1019-5149.JTN.2959-10.1
6. Rengachary SS, Arjunan K. Compression of the ulnar nerve in Guyon's Canal by a soft tissue giant cell tumor. Neurosurgery. 1981 Mar;8(3):400-5. doi: 10.1227/00006123-198103000-00014
7. Gertz MA, Dispenzieri A. Systemic Amyloidosis Recognition, Prognosis, and Therapy: A Systematic Review. JAMA. 2020 Jul 7;324(1):79-89. doi: 10.1001/jama.2020.5493
8. Jones NF, Ahn HC, Eo S. Revision surgery for persistent and recurrent carpal tunnel syndrome and for failed carpal tunnel release. Plast Reconstr Surg. 2012 Mar;129(3):683-692. doi: 10.1097/PRS.0b013e3182402c37
9. Craft RO, Duncan SF, Smith AA. Management of recurrent carpal tunnel syndrome with microneurolysis and the hypothenar fat pad flap. Hand (N Y). 2007 Sep;2(3):85-9. doi: 10.1007/s11552-007-9025-7
10. Lemonas P, Laing T, Ghorbanian S, Malahias M, Ragoowansi R. Extensor indicis proprius opponensplasty - the burkhalter revisited. J Hand Microsurg. 2012 Dec;4(2):47-9. doi: 10.1007/s12593-012-0066-y
11. Ginanneschi F, Mondelli M, Cioncoloni D, Rossi A. Impact of carpal tunnel syndrome on ulnar nerve at wrist: Systematic review. J Electromyogr Kinesiol. 2018 Jun;40:32-38. doi: 10.1016/j.jelekin.2018.03.004